

CASE OF COMPOUND DEPRESSED FRACTURE OF  
THE SKULL WITH WOUND OF THE LONGITU-  
DINAL SINUS; TREPHINING; ALSO FRAC-  
TURE OF THE SPINOUS PROCESS OF  
THE NINTH DORSAL VERTEBRA;  
RECOVERY; NOTE ON THE  
CONSTRUCTION OF THE  
TREPHINE.

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WILLIAM C., 32 years of age, of temperate habits, a brakeman by occupation, was admitted into the surgical ward of the Episcopal Hospital, October 19, 1884. Three hours before his admission, while putting down brakes from the roof of a freight car, moving at the rate of thirty-five miles an hour, the chain below parted, and, as his whole support depended upon a stick which he had thrust through the brake wheel in order to get additional purchase, he was hurled to the ground. When brought to the hospital he was almost unconscious, though resisted and became restless if handled or teased. His face was pale and his pulse feeble. The pupils were contracted equally and moderately. Respiration was noisy and slow, but not stertorous. There was no paralysis nor bleeding from the ears, nose or mouth. In addition to the head injury, presently to be described, there was discovered, while making a careful examination of his whole body for other injuries, a fracture of the spinous process of the ninth dorsal vertebra. On introducing the finger into a large wound of the scalp an extensive area of depressed bone could be felt over the right parietal region.

A small quantity of ether was given and the whole extent of fracture clearly exposed by dissecting up a large flap, including the tissues down to the bone, which was turned down over the temple and pinned in position. The exact location of the fracture has been clearly ex-



hibited in the accompanying illustration by exaggerating the size of the flap. An irregular triangle of depressed bone, about  $2\frac{1}{2}$  inches in its greatest length, was found to occupy principally the central portion of the right parietal bone. Its base was depressed the thickness of the skull, and was thrust far beneath the sound bone at the lower portion of the wound; while above, its apex extended to the parietal bone on the opposite side. Although much comminuted the fracture consisted chiefly of three fragments. Much care and diligence was required to

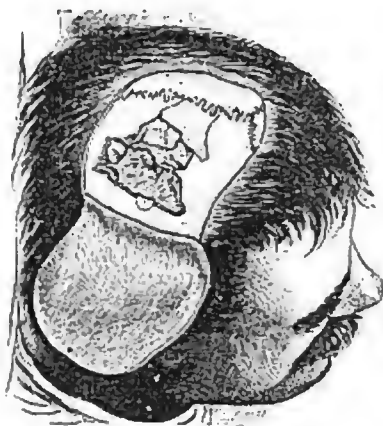


FIG. 1. EXTENSIVE COMPOUND DEPRESSED FRACTURE OF SKULL

elevate these, as they were very firmly locked into one another and nipped by the sound bone. It was necessary, however, to apply the crown of a trephine at only one point, that corresponding to the seat of greatest depression, where the fragment had been driven under the sound bone. Each fragment in turn, from below upwards, was elevated, and each, being found quite separated from its attachments beneath by clots of blood, was removed. Under and around the uppermost fragment were found the greatest evidences of hæmorrhage, and instantly it was elevated very free bleeding occurred. It was quickly lifted out, and the blood seen to escape from a circular wound in the longitudinal sinus about a sixteenth of an inch in diameter. This fragment, examined after its removal, was found to contain upon its under surface the Pacchionian depressions, and upon its upper border the



dentations of the sagittal suture, one of these latter having probably caused the wound of the sinus. The hæmorrhage, although profuse, was so thoroughly in view that it could easily be controlled temporarily simply by the weight of a finger. Several efforts were made to apply a fine ligature about the wound, but they were unsuccessful, and the patient lost much blood during each attempt. A small compress of lint, dusted with iodoform, was lightly applied to the wound in the sinus, a single intervening layer of lint being placed next the wound to prevent the entrance of iodoform into the circulation. The dura mater was otherwise uninjured, and showed apparently healthy pulsating brain matter beneath. The sharp edges of bone having been removed with gouge forceps, the wound was washed with carbolated water, loosely approximated with silver sutures and dressed with carbolized gauze dusted with iodoform.

The patient was a good deal blanched after the operation, but reacted well by evening, his temperature being  $100\frac{1}{2}^{\circ}$ . During the night and for two days following he was excessively restless, two men being required constantly at his bedside to restrain him. The urine was drawn off by the catheter for three days, after which it was voided voluntarily. On the fifth day the dressing was removed for the first time, and the wound found to be in a healthy suppurative condition, with primary union of the incised portion of the flap. After this it was dressed every other day. The compress was removed from under the scalp on the seventh day without causing recurrence of hæmorrhage. On the following day there appeared a slight erysipelatous blush upon the right cheek, which, however, drove the temperature up only to  $101^{\circ}$ , and faded within forty-eight hours. The wound filled up rapidly with granulations, and steady improvement continued until recovery was complete.

His mental condition from the first return of consciousness, at the end of two days, was characterized at first by perfect imbecility. The restlessness had disappeared, and he would lie upon his right side, staring vacantly around him. He paid no attention to what was said to him, and indeed showed no recognition of anything, except when winked at he would always wink in return. At the beginning of the second week intellection began to improve, when it was found that his memory was entirely gone. He had forgotten his age, how many children he had and their names. This symptom persisted long after his mental condition was otherwise restored, eight weeks after the accident still being unable to remember all of the stations on the railroad where he was employed. He had no headache at any time, and seldom complained even of discomfort at the seat of injury. Small pieces



of bone were several times removed, and an ulcer at the cicatrix still remained when he was discharged from the hospital. The fracture of the spinous process of the dorsal vertebra united slowly, but gave rise to no trouble.

He became an out-patient December 28, 1884.

Although the case, on account of the severity of the head injury, its favorable termination, and the somewhat unusual lesion of the spine, is worthy of record, the principal point of interest attached to the wound of the longitudinal sinus. The generally recognized fact, that if the hemorrhage proceeds from a point which is clearly exposed to view, there is no immediate danger, was here well illustrated. Its permanent arrest by means of a compress, though accomplishing the object, did not give that feeling of confidence which would have been obtained had the attempt to apply a ligature succeeded. Efforts to do this, with tenacula and forceps, were persevered in a number of times, and were not abandoned until there was risk of fatal syncope from the loss of blood which accompanied each attempt. The cause of failure depended on the tense character of the edges of the opening in the sinus, which would not yield sufficiently to permit of the puckering necessary to its closure.

The patient had apparently lost a good deal of blood before his admission; he certainly lost much during the operation; and to this cerebral depletion may properly be ascribed the very moderate character of the inflammation which followed.

#### A NOTE ON THE CONSTRUCTION OF THE TREPHINE.

*Its centre-point.* Several years ago, while substituting Dr. R. J. Levis in the wards of the Pennsylvania Hospital, I had occasion to trephine a boy eight years of age for compound depressed fracture of the skull, and, from an incident which occurred during the operation, had reason to be strongly impressed with a fact which, although quite apparent, has not, perhaps, been sufficiently emphasized—namely, that the depth reached by the centre-point of a trephine is equivalent to the distance it projects beyond the level of the teeth, *plus the depth the teeth of the instrument are sunk before they engage.* With due allowance, as I thought, for the extreme thinness of



the skull in a subject so young, I set the centre-point of a small trephine with a projection of about  $\frac{1}{32}$  of an inch, and directly the teeth engaged withdrew it. On lifting out the button of bone it was found to have been penetrated by the centre-point. Although no damage had been done thereby to the dura mater, and the case progressed rapidly to recovery, I censured myself for the occurrence, especially as I had some time before constructed a model of an instrument designed to avoid this very risk. The modification, which is a slight one,

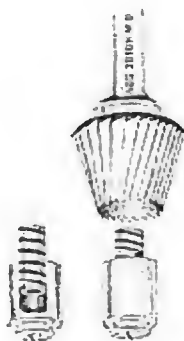


FIG. 2. MODIFIED TREPHINE CENTRE POINT.

and may be readily adapted to the ordinary instrument, has also for its object the absolute certainty of preventing penetration of the centre-point, through neglect to withdraw it at the proper time. It consists, as shown in the cut, of a cylindrical nut, armed with a minute point, which occupies the cavity of the crown and is projected therefrom by a spiral spring contained in its centre. Its action is obvious. When applied to the part, the centre-point engages, but slight pressure causes it to recede and permits the teeth to cut, until the nut has been pressed home in the cavity of the crown, when the teeth refuse to cut further until the nut is dropped out. After this the operation is proceeded with in the ordinary manner.

*Its crown.* The object, as is well known, of the conical



shape which has wisely been given to the modern instrument is to make it act like a reamer and bury no deeper than it cuts. As many are constructed, however, this may give a false sense of security. In careful hands, no cone is needed. In others, a slight cone may be worse than none. Theoretically, a trephine with a conical crown will not slip, after it has cut its way through the skull; but as even the most skillful manipulation fails to prevent all swaying to any instrument which is made to bore, the diameter of the circular orifice made in the skull by the trephine is greater than that of the crown, at the point it is cutting. The crown will, therefore, as soon as the resistance below ceases, enter until its diameter coincides with that made in the bone. Therefore it would seem advisable that the crown should be always made with a decided cone, as the slight increase given thereby to the bevel of the cut through the bone can hardly be urged as an objection.